

Claims

1 1. A method in a computer system for generating executable code
2 for a computer program, the method comprising the steps of:

3 receiving an intentional program tree having nodes, each node
4 representing a high-level computational construct of the computer program;

5 for each node representing a high-level computational construct,
6 transforming the node into an implementation of the high-level computational
7 construct using low-level computational constructs; and

8 for each node representing a low-level computational construct,
9 generating executable code that implements the low-level computational construct.

1 2. The method of claim 1 wherein a high-level computational
2 construct has a plurality of implementations of the high-level computational construct
3 and wherein the step of transforming the node includes when the high-level
4 computational construct has a plurality of implementations, selecting one of the
5 implementations and transforming the node in accordance with the selected
6 implementation.

1 3. The method of claim 2 wherein the step of selecting selects based
2 on annotations provided by a programmer.

1 4. The method of claim 2 wherein the step of selecting selects
2 automatically by analyzing semantics of the intentional program tree.

1 5. The method of claim 1 wherein the step of receiving an
2 intentional program tree includes creating the intentional program tree by direct
3 manipulation of the intentional program tree by a programmer.

1 6. The method of claim 5 including the step of receiving a new
2 high-level computational construct and receiving an implementation of the new high-
3 level computational construct that uses low-level computational constructs, wherein
4 the step of creating the intentional program tree includes adding a node to the
5 intentional program tree representing the new high-level computational construct, and
6 wherein the node representing the new high-level computational construct is
7 transformed using the received implementation.

1 7. The method of claim 1 wherein each high-level computational
2 construct has a function for transforming a node representing the high-level
3 computational construct into a node representing an implementation of the high-level
4 computation construct using low-level computational constructs and wherein the step
5 of transforming the node representing a high-level computation construct includes
6 invoking the function to transform the node.

1 8. The method of claim 1 wherein each high-level computational
2 construct has a function for displaying a representation of a node representing the
3 high-level computational construct.

1 9. The method of claim 1 including the step of before the step of
2 transforming, preprocessing nodes to store indications to control the transforming to
3 identify errors.

1 10. The method of claim 1 wherein the indications include flags to
2 indicate a low-level computational construct that corresponds to an overloaded high-
3 level computational construct.

1 11. The method of claim 10 wherein the step of preprocessing is
2 performed as a background activity during the step of receiving the intentional
3 program tree.

1 12. A computer system for generating a computer program, the
2 computer program having a plurality of high-level computational constructs, each
3 high-level computational construct having a behavior, the computer system
4 comprising:

5 means for creating an intentional program tree by direct manipulation of
6 the intentional program tree, the intentional program tree having nodes representing
7 the high-level computational constructs of the computer program;

8 means for reducing the intentional program tree to a reduced program
9 tree, the reduced program tree having nodes representing low-level computational
10 constructs, each high-level computational construct having a reduction enzyme for
11 reducing a node representing the high-level computational construct into one or more
12 nodes that implement the behavior of the high-level computational construct, each of
13 the nodes representing a low-level computational construct;

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- 14 means for adding a new high-level computational construct for use in
15 creating the intentional program tree, the new high-level computational construct
16 having a reduction enzyme, the new high-level computational construct for use in the
17 intentional program tree; and
18 means for generating executable code based in the reduced program tree.

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